

**ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION
AIR PERMITS PROGRAM**

**TECHNICAL ANALYSIS REPORT
For Air Quality Control Minor Permit AQ0503MSS03**

**BP Exploration Alaska, Inc. (BPXA)
Northstar Production Facility**

UPDATING PERMIT CONDITIONS

Prepared by: Jimmy Yap/MACTEC

Project Manager: Bill Hodan (MACTEC)

Permit Writer: Malay Jindal (MACTEC)

Contract Manager: Jimmy Yap (ADEC)

Supervisor: Zeena Siddeek

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Abbreviations/Acronyms:

AAC	Alaska Administrative Code
Department.....	Alaska Department of Environmental Conservation
AQC	Air Quality Control
BPXA	BP Exploration (Alaska) Incorporated
C.F.R.	Code of Federal Regulations
COBC.....	Compliance Order by Consent
IC.....	Internal Combustion
NSPS	New Source Performance Standards
PSD	Prevention of Significant Deterioration
PTE	Potential to Emit
TAR.....	Technical Analysis Report
ULSD	Ultra Low Sulfur Diesel

Units and Measures:

hp.....	horsepower
ppmw.....	parts per million by weight
ppmv	parts per million by volume
tpy	tons per year

Pollutants:

CO	Carbon Monoxide
HAPS	Hazardous Air Pollutants
H ₂ S	Hydrogen Sulfide
NO _x	Oxides of Nitrogen
PM-10	Particulate Matter with an aerodynamic diameter less than 10 microns
SO ₂	Sulfur Dioxide
VOC	Volatile Organic Compound

1.0 Introduction

This Technical Analysis Report (TAR) provides the Alaska Department of Environmental Conservation's (Department's) basis for issuing Air Quality Control Minor Permit AQ0503MSS03 to BP Exploration (Alaska), Inc. (BPXA) for the Northstar Production Facility (Northstar). This minor permit rescinds Air Quality Control Minor Permits AQ0503MSS01 and AQ0503MSS02. This permit is issued under 18 AAC 50.508(6) for revising terms and conditions of a Title I permit.

1.1 Stationary Source Description:

Northstar is an oil and gas processing facility located on Seal Island, an artificial gravel island six miles offshore of Point Storkersen in the Beaufort Sea, north of Prudhoe Bay. The stationary source contains fuel- burning equipment, diesel engines, gas turbines, heaters, flare, an incinerator, diesel generators and storage tanks for fuel, hydrocarbon waste, and other liquid chemicals. The stationary source is classified as a Prevention of Significant Deterioration (PSD) major source because the potential emissions of one or more regulated pollutants are greater than 250 tons per year (tpy).

1.2 Permit History

On February 5, 1999, the Department issued Air Quality Control (AQC) Construction Permit 9873-AC020 to establish an oil and gas processing facility, transportable drill rig, camp infrastructure, and emission units associated with development drilling, pipeline tie-in, on island construction activities, and crude oil processing. The Department revised the permit on November 12, 1999 (Permit 9873-AC020 Revision 1), March 28, 2000 (Permit 0073-AC-001, Revision 2), and August 16, 2000 (0073-AC011, Revision 3).

On November 1, 2000, the Department issued Permit 0073-AC021, authorizing BPXA to update emission factors for the five natural gas-fired non-road engines, Units 200 through 204. On September 12, 2001, the Department issued AQC Permit 0073-AC021, Revision 1 authorizing small changes for the small warehouse space heaters.

The stationary source operated under AQC Permit 0073-AC021, Revision 1 and Compliance Order by Consent (COBC) 2001-637-50-2154, issued on December 21, 2001. The Department replaced COBC 2001-637-50-2154 by COBC 2001-673-50-2654 dated February 21, 2003.

On July 20, 2007, the Department issued Permit AQ0503MSS01 to address BPXA's request for revisions to a number of conditions in AQC Permit 0073-AC021, Revision 1. Permit AQ0503MSS01 effectively rescinded COBC 2001-673-50-2654.

The Department issued Title V Operating Permit AQ0503TVP01 to the stationary source on August 15, 2008. Operating Permit AQ0503TVP01 included the stationary source requirements established in Permit 0073-AC021, Revision 1 as modified by Minor Permit AQ0503MSS01.

The Department issued Minor Permit AQ0503MSS02 to the stationary source on December 30, 2008 to delay the effective date for requiring the use of low sulfur diesel fuel.

1.3 Application Description

BPXA submitted a permit application on December 11, 2008, and an updated permit application on April 15, 2009. Both the initial and updated permit applications were for a Title I minor permit to revise the fuel gas sulfur limit and make other permit changes.

The Department reviewed BPXA's request to revise the best available control technology (BACT) limits on fuel gas hydrogen sulfide (H₂S) content from the current 50 ppmv to 95 ppmv. The Department determined that it could not grant the request as described due to an incorrect calculation of the resulting emission increase. The Department informed BPXA in a technical deficiency letter dated August 20, 2009, that they must revise the SO₂ emission calculation in order to process their application. Also, if the revised calculation based on baseline actual emissions to projected actual emissions exceeded the PSD threshold, BPXA would need to resubmit the application under PSD regulations as a major modification and include all of the elements necessary to perform a PSD review for the project.

The Department denied BPXA's permit request for the modification of Minor Permit AQ0503MSS01 to allow for the replacement of the two GE LM2500 combustion turbines with turbines from a "pool of turbine engines" as explained in the August 20, 2009 technical deficiency letter. The requested modifications did not address the applicability of New Source Review.

BPXA responded to the Department's technical deficiency letter in an October 26, 2009 letter. In the letter, BPXA withdrew the fuel gas sulfur limit request from the permit application, stating that they would resubmit the application with emissions calculations revised as requested by the Department. BPXA also withdrew the combustion turbine replacement request stating that they would address the issues later.

A BPXA email to the Department on November 23, 2009 requested that the Department proceed with the remainder of the change items in BPXA's October 26, 2009 letter. BPXA submitted additional information on February 10, 2010 in response to a Department's request.

The Department published the preliminary decision for Minor Permit AQ0503MSS03 on October 1, 2010. On October 13, 2010, BPXA informed the Department that they wanted additional permit changes to the permit. On a letter dated October 26, 2010 BPXA requested correction to the Fire Water Pump stack height requirement and deletion of the Rig Engines and associated equipment (Group D) from the emission inventory.

The Department is rescinding existing Title I minor permits AQ0503MSS01 and AQ0503MSS02 and issuing Minor Permit AQ0503MSS03 by carrying forward the active conditions from the previous Title I minor permits, with BPXA's requested revisions agreed upon between the Department and the Permittee.

1.4 Emissions Summary and Permit Applicability

Permit change items 5 and 6 would result in a decrease in potential-to-emit (PTE) and assessable emissions. Title V Operating Permit AQ0503TVP01 has already incorporated Item 5, but item 6 (Emission Unit 9b) and item 18 (Group D equipment) have not been accounted for.

Deleting Emission Unit 9b and Group D equipment will result in a small decrease in PTE. Table 1 shows the potential emissions and the assessable emissions for the stationary source.

Table 1 - Emissions Summary (TPY)^a

Pollutant	NO _x	CO	PM-10	SO ₂	VOC	HAPs	Total
PTE	562	1,153	331	56.5	150	8.5	2,261
Assessable PTE	562	1,153	331	57	150	0	2,253

Table Notes:

^a Table is taken from Title V Operating Permit AQ0503TVP01, Statement of Basis.

2.0 The Department's Review of BPXA's Permit Change Requests

The requested permit changes are all classified under 18 AAC 50.508(6) to revise or rescind terms and conditions of a Title I permit issued under 18 AAC 50. The Department did not accept all permit change requests.

- 1.** Move portable fuel tanks from Group B sources to Group C sources.

BPXA has stated that the six portable fuel tanks listed under Group B –Portable Equipment in Minor Permit AQ0503MSS01, are no longer located on Seal Island and would only be brought out in the event of a spill. The Department changed the description of the tanks into Portable Spill Cleanup Tanks and moved it under Group C –Intermittent Well Servicing Equipment as requested.

- 2.** Delete listing of Units No. 16, 17, and 18 from Group A sources.

Although Units 16, 17, and 18 are small units, they have operating limits for ambient protection. Therefore, the Department declined BPXA's request.

- 3.** Delete listing of Units Heaters from Group B sources.

The Department declined BPXA's request because Group B heaters are subject to annual fuel use limit of 162,038 gallons for ambient protection (See Condition 10 and Table 2 of Permit AQ0503MSS01). In order to remove these units from the emission unit inventory, BPXA would need to do an ambient assessment to show that fuel use limits are not needed for ambient protection.

- 4.** Modify the Equipment Use identification of Group C Heaters and Boilers.

The Department declined BPXA's request because these heaters are subject to annual fuel use limit of 162,038 gallons for ambient protection (See Condition 10 and Table 2 of Permit AQ0503MSS01). In order to remove these units from the emission unit inventory, BPXA would need to do an ambient assessment to show that fuel use limits are not needed for ambient protection.

- 5.** Delete Unit No. 15 from the permit as it has been removed from the facility.

The Department removed EU ID 15 from the Emission Unit Inventory as requested.

- 6.** Remove Unit No. 9b - Smart Ash Incinerator from the permit as it has been removed from the facility.

The Department removed EU ID 9b from Emission Unit Inventory of Minor Permit AQ0503MSS03.

7. List fuel type for Portable Fuel Tanks in Group B as hydrocarbon.

The Department revised the fuel type as “Portable Spill Cleanup Tanks.” The change has no effect on air emissions, compliance, or other permit conditions. See also the Department’s response to request No. 1.

8. Modify Condition 9.2 to clarify which units are subject to the ULSD requirements.

Condition 9.2 of Minor Permit AQ0503MSS01 imposed the phased fuel sulfur limits listed in the Department’s policy for *Intermittently Used Oilfield Support Equipment* (Policy and Procedure 04.02.105, dated November 20, 2006). Minor Permit AQ0503MSS02 rescinded and replaced Condition 9.2 with a new Condition 9.2 that revised the timeline for the phased limits. In both cases, the condition applied to *all* diesel-fired emission units, and consisted of an initial limit of 1,000 parts per million by weight (ppmw), with a subsequent limit of 15 ppmw.¹

Initially, BPXA asked the Department to restrict the 15 ppmw limit to just the diesel-fired non-road engines, and to *not* phase-out the 1,000 ppmw limit for the other diesel-fired units. The request is identical to an informal appeal previously granted by the Department in regards to the BPXA Liberty project (Construction Permit AQ0181MSS06). In the Liberty case, the Department noted the discretion allowed under the *Intermittently Used Oilfield Support Equipment* policy, and that a 15 ppmw limit originally imposed source-wide only needed to apply to the intermittent emission units. The Department noted that:

[BPXA’s] ambient modeling assessment clearly showed compliance with the National Ambient Air Quality Standards and prevention of significant deterioration increments, with a margin of safety, without the use of ULSD in the existing Endicott process units. As a result, it appears that the expansion of fuel sulfur limits as a permit condition applicable to the Endicott process units, while providing additional air quality benefits overall, would be unwarranted given the results for the ambient assessment.

The Northstar situation is analogous to the Liberty situation. BPXA used 1,000 ppmw fuel sulfur (1,500 ppmw for the emergency generators) in the modeling analysis submitted in support of Minor Permit AQ0503MSS01. The worst-case SO₂ impacts were only half of the air quality standard, which provides a wide margin of safety. Therefore, the Department’s previous decision to apply the 15 ppmw limit to *all* diesel-fired emission units was unwarranted.

BPXA’s subsequent October 26, 2010 additional request modifies this language as shown in item 17.

9. Change the Maximum Capacity on the Group B Crane to 215 hp.

The Department advised BPXA that Crane’s maximum capacity is listed as 250 hp (Condition 10 and Table 2 of Permit AQ0503MSS01). If the maximum capacity was revised to 250 hp and if BPXA subsequently needed to replace the 215 hp crane with a slightly larger crane, another permit change would be required.

BPXA withdrew this request on February 10, 2010.

10. Add descriptions for the LP Flare, Warehouse Heaters and Ball mill.

¹ Diesel fuel with a sulfur content of no more than 15 ppmw is commonly called “ultra-low sulfur diesel” or ULSD.

The Department incorporated the description “James P. Sheldon Co. Inc.” for the LP flare and Warehouse heaters in the Emission Unit Inventory Table Group A in Minor Permit AQ0503MSS03. The description for Ball Mill (Unit 213) is no longer in this Minor Permit AQ0503MSS03 because the Department removed Group D from the Emission Unit Inventory (See item 18). The change has no effect on air emissions, compliance, or other permit conditions.

- 11.** Modify Table 1 – Group C from “IC Engines 400 to 600 hp” to “IC Engines 250 hp to 600 hp”.

The Department had no objection to the change, and advised BPXA that: The current “Equipment Use” category includes engines with 400 to 600 hp. The Department previously determined under Title I, to address engines starting at 400 hp for this category. Changing the category to “250 to 600 hp” is more restrictive to the Permittee since Minor Permit AQ0503MSS01, Condition 10, Table 2 lists the maximum aggregate capacity/limit of IC engines from 400 to 600 horsepower as 1,675 hp.

The change has no effect on air emissions, and no direct bearing on compliance or other permit conditions, but is more restrictive to the Permittee as described above.

- 12.** Remove Condition 19 from the permit.

Since the Federal Standards of Minor Permit AQ0503MSS01 are incorporated in the operating permit, the Department removed Section 4 of the Minor Permit AQ0503MSS01.

- 13.** Facility operating report - change to quarterly.

The Department has no objections to increasing the frequency of the operating report (Condition 31 of Permit AQ0503MSS01) from twice a year to quarterly. This is consistent with similar requests for other stationary sources, and the Department incorporated this change in a number of other permits.

The change has no effect on air emissions, compliance, or other permit conditions. In subsequent BPXA’s October 26, 2010 additional request, the Permittee further requested revisions to the Operating Report condition as shown in item 18. The Department has therefore incorporated the requested change to Minor Permit AQ0503MSS03.

- 14.** Reword stack configuration condition 8.1 to correct typographical error.

BPXA requested three alternative modifications Condition 8.1 of Permit AQ0503MSS01, to correct error regarding a portable emission threshold of 40 bhp referred to in the condition. The Department reviewed the request and confirmed that the 40 bhp value is correct. As stated on page 2 of the Department’s March 6, 2007 modeling review memorandum, the non-intermittent portable units are not subject to the Department’s Intermittently Used Oilfield Support Equipment policy. Therefore, the 400 bhp threshold listed in the policy cannot be treated as a default threshold for all portable units. The Department evaluates modeling thresholds for portable units on a case-by-case basis. In this case, the Department determined that 40 bhp was an appropriate value. The Department has therefore kept Condition 8.1 as is.

- 15.** Modify Condition 11.3 to better define how flow meters and totalizers are calibrated or certified.

BPXA Northstar's Title V Permit AQ0503TVP01 already includes a corrected version of the language in the Permittee's requested change. The Department revised Condition 11.3 of AQ0503MSS01 to reflect the language currently shown in AQ0503TVP01 Conditions 21.3 and 21.4.

The change has no effect on air emissions, compliance, or other permit conditions.

- 16.** Please change the stack height listed in Condition 8.1b, Table 2 for the fire water pump to 17.32 meters above grade as modeled

The Department incorporated BPXA's requested change to the stack height of the firewater pump. The Department revised Condition 8.1b, Table 2 of Minor Permit AQ0503MSS01 as requested. The revised Table is in Condition 14, Table 1 of Minor Permit AQ0503MSS03.

- 17.** Revise Conditions 4.1 as follows:

“For the Group C emission units, all intermittently used oil field service equipment rated at less than 400 hp or 2.8 MMBtu/hr **and all other non-road diesel fired engines**, limit the maximum fuel sulfur content to less than or equal to 15 ppmw.”

As discussed in item 8, BPXA's subsequent October 26, 2010 additional request modifies Condition 9.2 of AQ0503MSS01 (referred here in item 17 as revision to Condition 4.1 of Minor Permit AQ0503MSS02).

Minor Permit AQ0503MSS03 restricts the 15 ppmw fuel sulfur limit to the intermittently used oil field support equipment and internal combustion units rated at less than 400 hp or intermittent boilers/heaters with a heat input rating of less than 2.8 MMBtu/hr as provided in the Department's policy for *Intermittently Used Oilfield Support Equipment* (Policy and Procedure 04.02.105, dated November 20, 2006).

The Department revised **Condition 9.2** of Minor Permit AQ0503MSS03 accordingly. The change has no effect on air emissions, compliance, or other permit conditions.

- 18.** Delete Group D equipment from the list of authorized emission units in the Emission Unit Inventory. Delete Group D sources from Table 2- Unit Specific Hourly, Daily and Annual Limits. Revise Condition **9** as follows:

“**Industrial Processes and Fuel-Burning Equipment** - Units 1-8, 10a, 10b, 11-13, 16-18, ~~206, 207, 210b, 219~~, and heaters listed in Section 1, Groups B and C.

The Department removed Group D equipment from the Emission Unit Inventory of Minor Permit AQ0503MSS03 as requested.

Revise Condition 13.1 as follows:

“Monitor and record the hours of operation each calendar month for Units 1-8, and 10b and 200-204. ~~Monitor and record hours of operation each month for Units 206-207 and 210b, when burning diesel fuel.~~ Record the cumulative 12-month rolling hours of operation for each month before the end of the following month. ~~For Units 200-204, record the number of hours in idle and full load.~~

The Department revised **Condition 11.1** of Minor Permit AQ0503MSS01 accordingly. The revised language is in Condition 17.1 of Minor Permit AQ0503MSS03.

Revise Condition 6 of Minor Permit AQ0503MSS01 as follows:

~~“6.4 — Nabors 33E Drill Rig Stationary Point Emission Units, Section 1, Group D; and~~

6.54 Keep records of all on-site equipment. Maintain equipment inventories for units listed in Section 1, Group A (Stationary Emission Units) ~~and Group D (Nabors 33E Drill Rig Stationary Point Emission Units).~~

The Department revised Condition 6 of Minor Permit AQ0503MSS03 as requested.

Delete the following conditions from Minor Permit AQ0503MSS01:

Conditions 4.2 and 4.3

Conditions 11.5 and 11.6

Conditions 12.3b, 12.3e and 12.4c

Conditions 25.1c and 25.2b and 25.3c

The Department removed Conditions 4.2, 4.3, 11.5, 11.6, 12.3b, 12.3e, 12.4c, 25.1c, 25.2b and **25.3b** from Minor Permit AQ0503MSS03 accordingly. Condition 25.3c is a typographical error in BPXA’s request, and refers to Condition 25.3b which includes Unit 219 from removed Group D.

19. Revise **Condition 18** as follows:

“During the life of this permit, the Permittee shall submit an original and one copy of an operating report by May 15 for the period January 1 to March 31 of the current year, August 15 for the period April 1 to June 30 of the current year, November 15 for the period July 1 to September 30 of the current year and February 15 for the period October 1 to December 31 of the previous year

The Department revised **Condition 31** of Minor Permit AQ0503MSS01 accordingly.

2.1 Department Findings

The Department made the following findings regarding BPXA’s application:

1. Northstar is classified as a PSD major stationary source as defined in 40 CFR 52.21(b)(1)(i)(b), adopted by reference in 18 AAC 50.040, because it has the potential to emit more than 250 tpy of a regulated air pollutant in an area classified as attainment or unclassifiable. This revision does not involve an increase in the potential to emit of any regulated pollutant.

2. Revising the existing Title I permit conditions described in the application requires a minor permit under 18 AAC 50.508(6) because BPXA is requesting changes to terms and conditions of Title I permits (Minor Permits AQ0503MSS01 and AQ0503MSS02).
3. The Department agreed to make the changes requested in items 1, 5, 6, 7, 8, 10, 11, 13, and 15 in BPXA's original permit application. The Department denied all other requests in the original application or were withdrawn by BPXA.
4. The Department agreed to make all the changes requested in items 16, 17, 18 and 19 in BPXA's October 26, 2010.
5. Minor Permit AQ0503MSS02 contained only one condition that revised the fuel sulfur limit in Permit AQ0503MSS01. With the establishment of a new fuel sulfur limit in this permit action, Minor Permit AQ0503MSS01 becomes obsolete.
6. Northstar is located in the North Slope Borough District. The project is consistent with the Alaska Coastal Management Program (ACMP) through AS 46.40.040(b)(1). This minor permit will decrease the emissions at the stationary source. Therefore, the modification is not subject to further consistency review as described in 11 AAC 110.820(k)(3). Moreover, there is currently no enforceable district policy for the North Slope Borough.

3.0 Permit Conditions

3.1 Requirements for all Minor Permits

As required by 18 AAC 50.544(a)(1), this minor permit identifies the stationary source, the project, the Permittee, and contact information. As required under 18 AAC 50.544(a), the minor permit contains the fee requirements of 18 AAC 50.400 – 18 AAC 50.499. This permit action does not change the assessable emissions for this stationary source. The minor permit includes the standard permit conditions in Section 7. No other requirements under 18 AAC 50.544(a) are established in this permit.

3.2 Requirements for a Minor Permit that Revises or Rescinds a Previous Title I Permit

As required by 18 AAC 50.544(i) this minor permit classified under 18 AAC 50.508(6) contains terms and conditions as necessary to ensure that the Permittee will construct and operate the stationary source in accordance with 18 AAC 50.

4.0 Permit Administration

This permit authorizes the Permittee to operate under the terms and conditions of this permit. The Department considers the Title I permit changes made by this minor permit to be Clean Air Act Section 502(b)(10) changes as defined in 40 CFR 71.2 as

changes that contravene an express permit term. Such changes do not include changes that would violate applicable requirements or contravene federally enforceable permit terms and conditions that are monitoring (including test methods), recordkeeping, reporting, or compliance certification requirements.

There are no changes to monitoring required of the Permittee. The old limits will no longer be an applicable requirement under the definition of Applicable Requirement in 40 CFR 71.2 because it is replaced by the new condition.

40 CFR 71.6(a)(13)(i) allows the Permittee to make Section 502(b)(10) changes without a permit revision if the changes are not Title I modifications, and the changes do not exceed allowable emissions under the permit.

Since the emissions do not exceed allowable emissions, this change at Northstar qualifies for the operational flexibility provisions of 40 CFR 71.6(a)(13). Therefore, the changes do not require a Title V permit revision before BPXA can operate under the provisions of Permit AQ0503MSS03 upon issuance.